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TROPHIC changes in the jaws have been much less frequently observed in tabes dorsalis than the disturbances in the nutrition of the joints and the bones of the extremities which so interestingly vary the course of that most common disease of the spinal marrow. Although the first observations of a tabetic maxillary affection were published as long ago as 1868, a German author¹ in 1891 was not able to collect more than

¹ Rosin : Deutsche Zeitschrift für Nervenheilkunde, 1891, Bd. i, p. 532. This writer collated the cases reported up to that date and appended a bibliography to his article; but his list is not quite complete. Since then Hudelo has recorded a case in Annales de Dermatologie et de Syphiligraphie, May, 1893, and Wickham has republished this case and added another in the same journal for January, 1894. A review of several French cases, most of which are referred to by Rosin, will be found in a paper entitled "Les Altérations Dentaires au Cours du Tabès," by Lemarié and Albert Bernard in L'Odontologie, February, 1894; a translation of this paper is contained in the Pacific Coast Dentist for May, 1894. In his contribution to the jubilee-volume of the University of Halle ("Ueber traumatische Tabes," etc., 1894; page 27 of the reprint), Hitzig gives a brief account of a tabetic patient observed in 1870 who had been affected in 1863 with the jaw-disease now under consideration. A case is mentioned by Gowers in his Manual of Diseases of the Nervous System, second American edition, vol. i, p. 411.



twenty-two cases. All of these were gathered from the French and German literature. Brief mention of the loss of teeth may occasionally be met in some English or American work, but no description of the typical tabetic disease of the jaw is presented. It is therefore hoped that the following account of a case which was observed at the San Francisco Polyclinic will not be deemed superfluous.

The patient, a man forty-three years of age, came under observation February 6, 1894, complaining of shooting pains in the lower extremities. Twenty years ago he had three or four soft venereal sores followed by suppurating buboes. No syphilitic symptoms supervened. During eighteen years of married life his wife had been well and had borne him three children, two of whom still live and are healthy, while the other died at fourteen years of some acute disease. About eight or nine years ago there were two miscarriages.

The patient was in good health until about seven years ago, when he was seized with his present disease—rather acutely, according to his account. While lifting a heavy piece of lumber he felt something give way in his back, and was unable to stand upright for several days thereafter. Then he staggered in walking, his legs yielded, and his thighs felt numb. A week after the injury there was complete retention of urine, and the catheter had to be passed during five or six weeks. The bladder gradually recovered to a great extent, but some weakness of the urinary current has persisted. For several years past he has experienced no normal desire to micturate, and passes his water at regular intervals, not in response to any stimulus, but as a matter of habit and prudence. When worried he is compelled to have recourse to the catheter. The bowels gave no cause for complaint.

For over two years after the time from which he dates his disease he had pain in the small of the back, and needed the support of a cane in walking. When the pain ceased and his gait improved the lightning-pains began in the legs and in the sides of the trunk, sometimes darting up into the left arm-pit, and they have continued to torment him frequently. There is no girdle-sensation. Sexual power is abolished. There have been neither laryngeal nor gastric crises. Vision is not disturbed. Some care is required to "regulate his walk," especially when descending stairs.

Incidentally the patient remarked that, although he had never suffered from toothache, he had in the course of the last three or four months lost thirteen of his upper teeth. He had previously had slight neuralgia in the right cheek and temple. The falling out of the teeth was quite painless and attended with very little or no bleeding. Thus, while eating, he would become aware that a tooth was loose, would easily extract it with his fingers, and then proceed with his meal, or the tooth would not even require "picking" (as the patient termed it), but fell spontaneously into his mouth.

He furthermore related that two pieces of bone had recently been painlessly cast off from the left side of the upper jaw.

In the course of his illness this man had taken a considerable quantity of drugs, among them potassium iodid, especially during the last two years, but he has not had stomatitis nor been salivated.

On the 6th of February the patient was described as a gray-haired individual of medium height. A large cicatrix in the right groin was the only reminder of the venereal infection. His gait was not conspicuously ataxic, but the usual tests disclosed a moderate degree of incoördination in the lower limbs. Romberg's symptom was quite marked.

There was the Argyll-Robertson pupil, and the left pupil was larger than the right. The knee-jerks were absent, as were also the plantar reflexes. The cremasteric reflex was faint on either side; the abdominal reflex was present and brisker on the right than on the left side, being rather excessive on the former; the right abdominal reflex could be provoked by stroking the upper part of the anterior and inner surfaces of the right thigh, as in the manipulation employed to produce the cremasteric reflex. There was slight anesthesia at the outer and inner borders of the feet and on the outer surface of both thighs; the anesthesia was more marked in the right gluteal region. Sensation was said to be less acute in the left half of the abdominal surface than the right, but this difference was purely subjective.

There was no anesthesia or ataxia in the upper extremities. The triceps reflex was not obtained; the periosteal reflexes of the forearm were present. Sensibility in the face was normal. The special senses were unimpaired. Thirteen teeth of the upper jaw were missing; only the two central incisors and the right wisdom-tooth remained. The lower set was complete.

In that part of the left superior maxilla from which the two fragments of bone mentioned by the patient were eliminated the gum¹ was swollen and lacerated, exposing the bone and secreting pus. This region, as well as the rest of the upper gums, was insensitive to pain; prodding the mucous membrane with hot needles or tapping on the exposed bone produced no discomfort. There was much tartar on the lower teeth, and the gums were irritated; the two central incisors were somewhat loose and tender. This was

¹ It had been subjected to dental treatment before the patient came to me.

the first time the patient had ever experienced anything like pain in a tooth. Apart from this, there seemed to be some analgesia of the lower gums also. Sensation in the tongue and mucous membrane of the cheek was preserved, also in the nasal mucosa.

On the 26th of February the patient reported that a few days before he had felt something loose in the left side of the upper jaw, and with his tongue had dislodged a third piece of bone, which he brought for inspection. The exfoliation of this sequestrum was perfectly painless. The sequestrum contained an alveolus. After this event the erosion of the gum promptly began to heal, and in a short time only a depression in the alveolar process marked the site of the necrosis. One of the lower incisors, which was loose and tender, was extracted at about this time by a dentist, as it projected beyond the line of the teeth, and was deemed superfluous. Its extraction was stated to have been quite painful. It is well to emphasize the fact that this trouble in the lower jaw was solely due to the accumulation of tartar. There has been no disturbance since.

Until nearly the middle of May there was no further alteration in the patient's dental condition. Then another breach was made in his *ἔρκος ὀδόντων*, for the two remaining upper incisors became loose, and he "picked" one of them himself without pain or bleeding, while a dentist removed the other with almost equal ease. Soon the same process was established at the site of these teeth as had previously taken place on the left side of the upper jaw, and on the 7th of June a fragment of bone was exfoliated. After this the lesion of the gum quickly healed.

On the 11th of June the patient complained of pain on the inner side of the right cheek, opposite the molars. Inspection revealed the presence of an

ulcer of the gum, extending forward from the last molar about an inch, and invading laterally the mucosa of the cheek, but displaying no tendency to spread toward the hard palate. The ulcer was quite pale and torpid; excepting where it encroached on the cheek it was analgesic; it exposed the bone, which was evidently necrotic, and secreted considerable pus.

At this stage of his disease the man was shown to several dentists who had convened in San Francisco to attend the Mid-Winter Fair Dental Congress. A number of the teeth which had been shed were carefully examined and pronounced sound. It was established that their falling out was not due to pericementitis, pyorrhœa alveolaris, or any other process with which dentists ordinarily have to deal. Dr. William J. Younger, a dentist of more than national reputation, testified that this maxillary disease was all but unique in his very extensive experience.

No palpable fragments of bone were cast off from this ulcer, but the alveolar process was nevertheless undergoing disintegration, for soon a probe entered the antrum through the ulcer without encountering resistance. Many weeks elapsed before a tendency to heal became manifest. Finally, however, the gums closed again over the bone, leaving a long delicate cicatrix over the depression in the alveolar process and a small opening leading into the antrum.

On the 25th of June the right wisdom-tooth dropped out, and the denudation of the upper jaw was now complete. A sharp-pointed instrument inserted into the socket of the tooth provoked no pain. It was now about nine months since the "devastation had begun," but not yet was the "business of destruction done."

In the beginning of July, long before the ulceration of the gums on the right side had healed, a small ulcer appeared in the gum on the left side of the upper jaw at about the site of the last molar. This erosion gradually extended forward until it reached the locality of the left lateral incisor. It was pale, atonic, and analgesic. Like its companion on the other side of the jaw, it occupied the external half of the alveolar ridge, tending to invade the cheek, but avoiding the roof of the mouth. The bone was exposed, and there was a discharge of thin pus. No fragments of bone were eliminated, but there was evident osseous decay, for soon the antrum was opened. It was not until the middle of October that this ulceration had healed, leaving a still larger depression in the alveolar process than had been produced by the necrosis in February, and the fistula of the antrum.

At present (in the last week in October) no destructive process is visible in the jaw, but a recurrence must be apprehended.

Although not pertinent to the subject under immediate consideration, the patient's clinical history may be supplemented by adverting to an event of the 28th of June. On the morning of that day, as he was about to board a street-car, his left leg suddenly gave way at the knee; it felt "as if weighted with a ton," and seemed devoid of sensibility. When seen in the afternoon, the patient's gait was very unsteady, and he was forced to support himself on a cane; the ataxia was now quite marked, but it was much more conspicuous in the left leg than in the right. Tactile sensation was not so profoundly altered as the patient's account might have led one to suppose, but it was somewhat blunted in the left lower leg and foot as compared with the right; there was a distinct reduction of

electro-cutaneous sensibility in the former; the retardation in the conduction of painful and thermic impressions amounted to five seconds in the left foot and three seconds in the right; and the muscular sense was now greatly disturbed in both lower limbs, but especially in the left one. There was also some loss of power in the left foot, but the muscles reacted well to the faradic current. Romberg's symptom was more marked than before.

With this acute onset, or at least sudden increase, of incoördination, there came a cessation of the lightning-pains. The appetite, sleep, and digestion improved, and the patient was enabled to resume his work (as a distributor of quack-advertisements!).

Unfortunately, during the cool weather prevailing in the middle of August the pains recurred with all their former severity. Then the disturbance in the leg began to abate, and examination a month later disclosed decided improvement in regard to the steadiness of the gait and some diminution of the other symptoms. The patient now walks without any support; but the lightning-pains continue to torment him.

The subjective and objective symptoms as herein set forth are sufficient to establish the diagnosis of *tabes dorsalis*.

With respect to the changes in the jaw and the loss of teeth, this case conforms on the whole to the manner in which these disturbances took place in the majority of cases reported in neurologic literature. A survey of all the accessible records, however, shows certain variations in the extent and the rapidity of the destructive process, as well as differences with regard to the period of *tabes* in which the maxillary disorder may supervene.

The immunity of the lower jaw in the present instance is worthy of note. In no case does the disease appear to have involved the lower jaw before the upper had been affected. Either both jaws are seized simultaneously, or (as in the larger proportion of cases) the upper becomes diseased first. Years may elapse between the onset of the trouble in the upper jaw and the implication of the lower.

As has been said, the shedding of the teeth and the destruction of the bone progress with variable rapidity. A few teeth having dropped out, and a necrotic fragment of bone having been exfoliated, a pause may succeed, lasting in some instances for years, before more teeth and more of the substance of the jaw undergo the same fate; or the denudation of the jaw may be completed in a very short time; thus, in one instance,¹ two weeks sufficed to deprive the upper jaw of all its teeth; and Gowers² tells of a patient who found that all his upper teeth fell out in the course of three days, without any pain or decay.

The maxillary disease may appear at any stage of *tabes dorsalis*. In some instances over twenty years had elapsed since the onset of the latter; in others fifteen, ten, seven, and four years respectively, and one individual is related by Hoffmann to have lost all his upper teeth in the characteristic way over one year and a half prior to the first typical manifestations of *tabes*.

The dropping out of the teeth is sometimes un-

¹ Hoffmann: *Berliner klinische Wochenschrift*, 1885.

² *Manual*, I, p. 411.

attended with necrosis of the jawbone. In two such cases the patients were affected also with the loss of their nails, and in another there was a perforating tabetic ulcer of the foot.¹

In Wickham's paper on "Ulcérations buccales tabétiques" (*Annales de Dermatologie et de Syphiligraphie*) a patient is described who was afflicted with three perforating plantar ulcers, two on one foot and one on the other. This individual had lost in a comparatively short time, without pain, all his upper teeth and a number of his lower teeth, and the alveolar process was atrophied. There was on the alveolar border of the upper jaw a large, indolent ulcer apparently like those seen in my patient, but evincing a tendency to extend toward the roof of the mouth; it was anesthetic and penetrated to the bone, and Fournier, considering it to be of the same nature as the perforating ulcers of the foot, proposed to call it "*mal perforant buccal*." In another case observed by Wickham and previously reported by Hudelo, this same maxillary affection was not associated with trophic lesions in any other part.

As far as can be judged from the description, there seems to be no essential difference between these "ulcérations buccales tabétiques" and those which in my patient exposed the bone. It has been seen that the latter are not necessarily associated with the elimination of appreciable fragments of bone, although the bone at the base is decayed,

¹ Weizsäcker observed a patient with loss of teeth, necrosis of the upper alveolar process, and tabetic disease of the knee-joints. Referred to by Rosin.

and that they ultimately heal in one part, while others form in other localities. We may agree with the statement of Wickham that the characteristics of these lesions are well marked ; indeed, they are so pronounced that Fournier was enabled in the second case which he encountered to diagnosticate *tabes* simply by inspection of the mouth.

I have not been able to ascertain any instance in which this affection of the jaws accompanied any other nervous disease than *tabes dorsalis*.¹ Nor does it seem to occur as an independent disorder, and its distinction from the effects of phosphorus, actinomycosis, and other agents deleterious to the jaws and teeth meets with no difficulty. Syphilis, which is credited with so preponderant an influence in the production of *tabes*, cannot be held directly responsible for this jaw-disease associated with *tabes*, and we have Fournier's authority for the statement that Hudelo's case was not syphilitic.

Atrophy of the jawbones, especially the upper, and loss of teeth, may occur also in facial hemiatrophy, but the course and the attending circumstances are different in the two disorders. Their pathology, however, may be fundamentally identical, both being the supposed result of impaired trophic influence of the fifth nerve. It is interesting in this

¹ Westphal demonstrated in 1885 to the Berlin Neurological Society a man "who had been suffering for several years from severe neuralgia in the area of the right trigeminal, especially its maxillary branches, and now presented a peculiar disturbance in the nutrition of the gums and the teeth of the right upper and lower jaws." *Archiv für Psychiatrie*, Bd. xvii. I have not met with any other reference to this case, explaining the nature of the "peculiar disturbance."

connection to note the coincidence of facial hemiatrophy and tabes dorsalis in a case reported by Jolly.¹

The fifth nerve has been found affected in its trunk, ganglion, roots, and nuclei in various cases of tabes which had presented symptoms in the area of its distribution during life. But the only necropsies of cases in which the tabetic jaw-disease was among these symptoms are those recorded by Demange,² who made an anatomic examination of an individual who, about the fifteenth year of his tabes, had lost in less than two months all the teeth of his upper jaw, one after the other, in the characteristic manner; there was marked inflammation of the trigeminal nerves and atrophy of their bulbar nuclei. In another case observed by the same writer all the upper teeth on the left side had dropped out in the course of a month, while those on the right side were almost intact.³ The autopsy disclosed atrophy of both fifth nerves, that of the left greatly exceeding that of the other, and there was also complete atrophy of the left Gasserian ganglion.

The anesthesia resulting from the disease of the nerve is by no means sufficient to account for the disturbance in the nutrition of the jaw; this has been proved by clinical observation and experimen-

¹ Berliner klinische Wochenschrift, 1891, p. 924. No mention is made in this case of a maxillary or dental trouble.

² Revue de Médecine, March, 1892. Quoted in L'Odontologie, February, 1894, p. 67.

³ Charcot exhibited a tabetic woman with anesthesia of the left side of the face, loss of taste in the left half of the tongue, and falling out of teeth on the left side. Leçons du Mardi, 1887 to 1888, p. 85.

tal research. We are constrained to assume an alteration of the trophic influence exercised by the nervous apparatus on the tissues. The trophic action of nerves has been as vehemently denied as it has been asserted in the discussions on the pathology of certain other lesions observed in the course of tabes;¹ it is the failure to corroborate the theory of such action by experimental methods that has prevented its general acceptance as an explanation of occurrences like this disease of the jaw. The recent labors of Gaule² have, however, shown how subtle are the conditions that determine the success or failure of experimental investigations on the trophic properties of the nervous system; it is to be hoped that the further prosecution of these researches may result in elucidating by experiment the effects wrought in cases like this by disease.

¹ See the debates at the Clinical Society of London, November and December, 1885.

² Berliner klinische Wochenschrift, 1893.

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